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Working Document

AGR/TAC:IAR/90/5 Rev. 1

THE CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH

TECHNICAL ADVISORY COMMITTEE

ROLE OF THE CGIAR IN FISHERIES RESEARCH

TAC SECRETARIAT

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

June 1990

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ROLE OF THE CGIAR IN FISHERIES RESEARCH

1. BACKGROUND 1/

Fisheries play a very important role in food production, income generation and providing employment in developing countries. The aquatic environment covers 70% of the earth's surface, and the total production of aquatic commodities amounts to 95 million tonnes annually, of which 85% is in the form of finfish, 4% crustaceans, 7% molluscs and 4% seaweeds. Fish and fish products provide 20% of animal protein and 4% of dietary protein in developing countries. For more than one billion people, fish is the main source of animal protein. The fishery sector provides significant income and employment opportunities. For some 100 million people in developing countries, the majority of whom are low-income people, fishing provides the daily livelihood.

Of the global aquatic production only 12% originates from aquaculture, but in value terms this share amounts to 29%. Aquaculture differs from fisheries in a similar way as agriculture is distinguished from hunting and gathering. It implies ownership or control over the aquatic commodity, and that actions have been taken by the owner(s) to direct the energy flow in the ecosystem in the direction of the commodity produced. During 1986, total world aquaculture production amounted to 11 million tonnes, of which 50% consisted of finfish, 4% crustaceans, 21% molluscs and 25% seaweeds. About 82% of world aquaculture production originates in Asia.

The demand for fish and fish products has been growing at a high rate but most of the traditional sources of fish, such as marine stocks have already been fully exploited, or in many cases even over-exploited. Capture marine fisheries may be reaching a production plateau despite a sharp growth in production capacity. If this trend is correct, more research on capture fisheries stock assessment and management may be required to enable sustainable increases in production. The rate of growth of capture fisheries has slowed down during the last decade and prices have started to rise rapidly. The increasing demand for fish and fish products will have to be met by an expansion of aquaculture production, and improved fisheries management.

Attempts to introduce aquaculture among resource-poor farmers with no former fish farming tradition have met with little success. The major constraints to technology adoption appear to be socioeconomic in nature and there is a lack of appropriate technology for small scale production. Recent attention for fisheries has also been fueled by increasing concern for the conservation of coastal and freshwater environments.

A recent Study on International Fisheries Research, undertaken on behalf of the World Bank, FAO, UNDP, EEC and 12 bilateral donor agencies, as well as previous TAC reports have stressed the strong need

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1/ The data presented in this section are the most recent available and refer to 1986. They are estimates from FAO. A list of definitions used in the report is provided in Annex I.

for an expansion of research on fisheries. An international effort on fisheries research would contribute significantly to the CGIAR mission and goals as the resulting sustainable increase in productivity would lead to improved nutrition and economic wellbeing of low-income people. Fisheries research would also contribute to a better management and conservation of natural resources, an improved policy environment and strengthened national research systems.

2. NEED FOR CGIAR INVOLVEMENT IN FISHERIES RESEARCH

TAC's deliberations on a possible CGIAR initiative in fisheries research started at its second meeting in October 1971. An overview of the results of these deliberations and subsequent discussions, as well as a chronology of events, are summarized in the report of the TAC ad hoc Working Group on Aquaculture. The discussions received new momentum in 1985 when in the Review of CGIAR Priorities and Strategies TAC identified aquaculture as a subject matter area of high priority for CGIAR support. Following the approval of TAC's recommendations by the CGIAR, a number of reports have been prepared on the focus of such an international research initiative, and how it might be implemented. In addition, since 1988 FAO has been working on the preparation of an Action Plan for Aquaculture Development, and in 1989 a group of donors, as already mentioned, launched a Study of International Fisheries Research (SIFR). The need for an international research effort on aquaculture and fisheries is beyond doubt and is well elaborated upon in each of the reports. What is less clear, and as yet unresolved, is whether the CGIAR has a comparative advantage in addressing that need. TAC has also not yet made a firm commitment that the subject matter area is of sufficiently high priority as compared to other areas of CGIAR concern.

TAC's Interim Report on a Possible Expansion of the CGIAR points to the needs for international research on fisheries in each of the major developing regions. With respect to the research category of resource conservation and management in all regions there is a need for development and validation of models for management of capture-based fisheries, and for the application of remote sensing methods to improve quantification of fisheries stocks.

Priority areas in fish productivity research include studies on fish nutrition, particularly nutritional requirements of cultured aquatic species, nutritional constraints in extensive and semi-intensive systems, and the development of alternative feedstuffs. The development of appropriate fish production systems is of particular relevance to Asia but with spillover potential for other regions. Such studies should focus on pond productivity and nutrient dynamics, especially in semi-intensive systems, and on carrying capacity of open aquatic systems. Improving germplasm and maintenance of quality of stocks of key species is also a priority area. There is a need for constraint analysis on pests and diseases and for studies of methods for propagation of seed. In Asia and sub-Saharan Africa there is also a need for research on aquaculture engineering, particularly on fish-farm design and cage, pen and other enclosures.

High priority should also be given to understanding human health hazards in fishing systems, and the development of fish processing/preservation techniques. Policy analysis and research on

institutional systems is also of crucial importance. A CGIAR initiative would have to focus on the strategic research needs and on strengthening the national research capabilities of developing countries.

With respect to the strategic research needs of the more narrow field of aquaculture, according to the TAC ad hoc Working Group and the SIFR, attention would have to focus on the following areas:

- Physiology and ecology of reproduction and nutrients
- Resource management of aquatic organisms
- Development of integrated aquaculture/farming systems and of small scale culture-based fisheries
- Constraint analysis of pests and diseases
- Socioeconomic impact assessment.

A detailed review of the research needs for improved aquaculture development, the potential contribution of scientific disciplines to aquaculture and of the ways and means of overcoming geographical disparities in knowledge is discussed in the SIFR report of the working party on research needs for aquaculture development.

None of the CGIAR Centres has major research activities in the field of fisheries or aquaculture, although through the Asian Rice Farming Sytems Network IRRI has done some collaborative research with the International Centre for Living Aquatic Resources Management (ICLARM), the only non-associated centre with activities in this field. There is potential for a possible involvement of IFPRI, ISNAR, IITA and WARDA on different aspects of fisheries research but to date this has not materialized.

3. CURRENT AND PLANNED ACTIVITIES OF ICLARM

ICLARM has been established to conduct, stimulate and strengthen fisheries and aquaculture research in Asia and the Pacific Islands. It was set up through the support of the Rockefeller Foundation along the lines of a CGIAR Centre with respect to governance and mandate. Recently, ICLARM has extended its work to Africa (Malawi) and Latin America (Peru). ICLARM sees its role as complementing and supporting national and regional research institutions. Although research forms the major thrust of its activities, the Centre also gives high priority to its information and training activities. Approximately 37% of its resources are allocated to research, 15% to information and communication, 6% to training, 26% to technical or financial assistance, and 16% to general administration and operations. ICLARM classifies approximately 41% of its research as strategic, 33% as applied, and 26% as adaptive in nature. (Annex II).

ICLARM's research is mostly carried out in association with national programmes through collaborative relationships, although the Centre is usually both the leader and donor in the collaboration. (Annex III). The Centre also coordinates a number of networks, most of which have information exchange as their major activity (Annex IV).

ICLARM does not have a strategic plan, but has recently developed a medium-term plan for the period 1988-92.

ICLARM's current and planned activities have been summarized in the report of the TAC Fact-Finding Mission. ICLARM has three research programmes: Aquaculture, Capture Fisheries Management and Coastal Area Management. In addition, ICLARM has an active information and publication programme. ICLARM does not have research facilities of its own.

Each of ICLARM's research programmes has adaptive, applied and strategic elements and meets to some extent, or intends to meet in the future, priority needs for international fishery research. Due to a financial crisis that started in 1985 when the Centre lost its primary source of core funding, ICLARM's programme has to a large extent become donor driven. In order to be able to maintain a minimum number of core staff, ICLARM has been increasingly dependent on short-term restricted and special project grants. The Coastal Area Management Programme particularly is largely development and technical assistance oriented and accounts for a large share of ICLARM's resource allocation.

At present ICLARM's activities are concentrated in Asia and the Pacific Islands, with the exception of programmes in Malawi and Peru. ICLARM believes that results obtained in Asia will be applicable to Africa and Latin America, but this process of technology transfer may be far more difficult than anticipated because of the local specific nature of low-input production systems.

4. RESEARCH BY OTHER ORGANIZATIONS

4.1. SEAFDEC

The Southeast Asian Fisheries Development Centre (SEAFDEC) is a regional intergovernmental fisheries development organization based in Iloilo, Philippines. It was established in 1973 and its member nations are the Philippines, Japan, Thailand, Malaysia, Singapore and Vietnam. SEAFDEC has an aquaculture programme with a mandate to undertake research and provide training for the development of appropriate technologies for tapping Southeast Asia's vast potential for aquaculture. SEAFDEC also has a Marine Fisheries Research Department in Singapore and the Marine Fisheries Training Department in Bangkok, Thailand. The Centre's first priority is training, and its research is usually conducted in support of training. Although SEAFDEC has good research facilities, recently they have suffered from a lack of maintenance. SEAFDEC's research interests in aquaculture are similar to those of ICLARM, there has been little collaboration between both institutes.

4.2. NACA

The Network of Aquaculture Centres in Asia (NACA) grew out of a UNDP/FAO regional project and is since January 1990 an intergovernmental body established by 13 participating governments of Asia and the Pacific region to assist them in expanding aquaculture for increased production of living aquatic resources (specially fish and shellfish) to improve rural welfare, diversify rural farm production and enhance foreign

exchange earnings. NACA seeks to achieve its objectives through action programmes implemented by a network of regional lead centres in China, India, the Philippines and Thailand that are closely linked to a number of national centres in the participatory countries.

NACA's activities focus on training, applied research and information collection and dissemination. It is not involved in long-run strategic research, but focuses primarily on transfer of technology. ICLARM and NACA cooperate through joint meetings, conferences and publications but relations are not as synergistic as they might be given the complementary nature of their mandates, priorities and strategies. According to a SIFR report, NACA is not at present in a position to take on regional leadership in aquaculture.

4.3. Asian Institute of Technology

The Asian Institute of Technology (AIT) is an independent international and non-profit making educational and technological institution. AIT has aquaculture as one of five fields of study within the division of agricultural and food engineering. The majority of aquaculture staff are seconded to AIT from the United Kingdom. The AIT aquaculture department has research programmes associated with its graduate research activities. The main emphasis of the research is on low cost semi-intensive aquaculture systems appropriate to the limited resource base of small-scale farmers, and on production of herbivorous fish. AIT has extensive research facilities.

4.4. National Programmes

The activities and strengths of national research programmes are discussed in Dr. Idyll's second report and in the draft report of SIFR. In general, national programmes are severely constrained by the fact that fisheries departments come under the Ministry of Agriculture, and that they have a severe shortage of qualified staff and operating funds. India has a strong national programme with good capabilities in genetics. Thailand, Indonesia and Malaysia have good facilities but are constrained through lack of operational means and their links with the Ministry of Agriculture. In Asia, all fisheries research departments give high priority to aquaculture.

Other bilateral and multi-country activities in the fisheries field include ASEAN-EEC Aquaculture Department and Coordination Programme (AADCP), the USAID-CRSP and FAO/ADCP.

5. MAJOR ISSUES TO BE ADDRESSED BY THE PANEL

(i) Is the subject matter area important enough to merit CGIAR support?

(ii) What are the needs for international research on fisheries? Which needs would qualify for CGIAR support?

(iii) What is the comparative advantage of ICLARM as distinct from regional research organizations such as SEAFDEC, NACA and AIT? How could responsibilities for international research be shared effectively?

(iv) Which parts of ICLARM's programme meet international research needs that may merit CGIAR support? Can those parts be separated from the other ICLARM programmes?

(v) What is the relative importance of the various fish production systems?

(vi) What are the strategic research needs of Asia as distinct from Africa and Latin America?

(vii) Should a possible CGIAR initiative focus on aquaculture only, or on the broader field of fisheries management and environment conservation? Would an international initiative necessarily be oriented towards development research? What are the likely distributional implications of alternative research foci? Is intensive aquaculture research likely to be of more or less benefit to low income regions, fishermen and consumers than semi-intensive/extensive culture fisheries and marine/coastal capture fisheries?

(viii) Should the institutional vehicle for a possible CGIAR initiative be a centralized international type of operation or through support of decentralized regional models? Should an international initiative be through a CGIAR type of institute? What are the institutional options?

6. OPTIONS

(a) The subject matter area is not important enough in comparison to other ongoing potential areas of CGIAR activity, or does not contribute sufficiently to the CGIAR mission and goals.

Option: ICLARM should remain outside the CGIAR.

(b) The subject matter area is important enough to merit a CGIAR initiative but ICLARM's programme only partly addresses the priority needs for international research.

or: ICLARM meets the criteria for CGIAR support and its programmes are meeting priority demands for international research.

Option: ICLARM prepares a strategic plan followed by a full scale EPR/EMR of ICLARM.

(c) Not enough information is available to take a decision on whether or not a CGIAR initiative is warranted.

or: The subject matter is important enough to merit a CGIAR initiative but ICLARM does not provide an appropriate institutional vehicle.

Option: Additional mission to collect views of national and regional research programmes on a possible CGIAR initiative and a possible role for ICLARM, and other additional information as required.

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ANNEX I

DEFINITIONS USED IN THE REPORT

Fish. Generally include all aquatic organisms, whether plant or animal (finfish, shell, shrimp, molluscs, algae, and so on).

Seed. Juvenile forms of fish produced in hatcheries or collected in the wild, and used for stocking purposes.

Capture fishery. The harvesting of natural populations of wild stocks, the populations of which are generally considered a common resource and controls are usually through license or permit.

Culture-based fishery. A type of captive fishery where populations of desirable wild stocks are supplemented by the release of hatchery-produced seed to grow under natural conditions. Populations are considered a common resource, although cooperative agreements or government agencies control stocking, while licenses and permits control the subsequent harvest.

Aquaculture. Aquaculture is analogous to agriculture and implies ownership and control over the organisms from seed to harvest, whether the organisms are cultured in natural or man-made water bodies and/or confined in pens or cages.

ICLARM'S BUDGET ALLOCATION TO RESEARCH AND RELATED ACTIVITIES 1/

Proportion of Budget Allocated to:*

Research:	
--Strategic	15.3%
--Applied	12.5%
--Adaptive	9.5%
Development of Research Capacity:	
--Training	5.5%
--Technical Assistance ++	12.6%
--Financial Assistance ++	13.8%
--Information and Communications	14.7%

(*) The total cost will not sum to 100%.

(++) To individual national programmes and through networks.

Also required: Breakdown to show proportions of budget allocated to (i) research (ii) related activities and (iii) administration, etc.

Research	37.3%
Related Activities	46.7%
General Administrative	11.8%
General Operating	4.2%

1/ Information provided by ICLARM

ANNEX III

ICLARM'S RELATIONSHIPS WITH NATIONAL PROGRAMMES

COLLABORATION WITH INDIVIDUAL COUNTRIES (DEVELOPED OR DEVELOPING) 1/

	Philip-pines	Thailand	Malay-sia	Singa-pore	Brunei
Purpose of Collaboration					
-Strategic Research	X				
-Applied Research	X	X	X	X	X
-Adaptive Research	X	X	X	X	X
-Institution-building	X	X	X	X	X
Types of Relationships					
-Collaborative	X	X	X	X	X
-Contracting					
-Enabling					
Role(s) of the Center in the Collaboration:					
-Leader/controller	X	X	X	X	X
-Customer					
-Partner/Collaborator (No funding from Center)	X				
-Donor	X	X	X	X	X
-Channel for funding					

1/ Information provided by ICLARM

	Indonesia	Bangladesh	Malawi	Solomon Islands	France
Purpose of Collaboration					
-Strategic Research			X	X	
-Applied Research	X		X	X	
-Adaptive Research	X	X			
-Institution-building	X	X	X		X
Types of Relationships					
-Collaborative	X	X	X		
-Contracting		X			
-Enabling				X	X
Role(s) of the Center in the Collaboration:					
-Leader/controller	X	X	X	X	X
-Customer					
-Partner/Collaborator (No funding from Center)		X	X		
-Donor	X	X		X	
-Channel for funding					

	Peru	Norway	United States	Fed. Rep. Germany	Austra-lia
Purpose of Collaboration					
-Strategic Research	X	X		X	X
-Applied Research		X	X	X	X
-Adaptive Research			X		
-Institution-building			X	X	X
Types of Relationships					
-Collaborative	X	X	X	X	X
-Contracting			X	X	X
-Enabling					
Role(s) of the Center in the Collaboration:					
-Leader/controller	X				
-Customer		X			
-Partner/Collaborator (No funding from Center)	X	X	X	X	X
-Donor					
-Channel for funding			X	X	X

ICLARM'S RELATIONSHIPS WITH NATIONAL PROGRAMMES

PARTICIPATION IN NETWORKS 1/

	AFSSRN	NTFS	NTAS	CAN
Purpose of Collaboration				
-Strategic Research			X	X
-Applied Research	X	X	X	X
-Adaptive Research	X	X		
-Extension				
-Institution-building	X			X
Type of Network:				
-Collaborative	X	X	X	X
-Res. Contracting	X			
-Res. Enabling	X			X
Role(s) of the Center in the Network:				
-Administrator/Controller	X	X	X	X
-Scientific coordinator	X	X	X	X
-Partner/ Collaborator (No funding from Center)				X
-Scientific Consultant				
-Channel for funding	X			

AFSSRN - Asian Fisheries Social Sciences Research Network
NTFS - Network of Tropical Fisheries Scientists
NTAS - Network of Tropical Aquaculture Scientists
CAN - Coastal Aquaculture Network

1/ Information provided by ICLARM